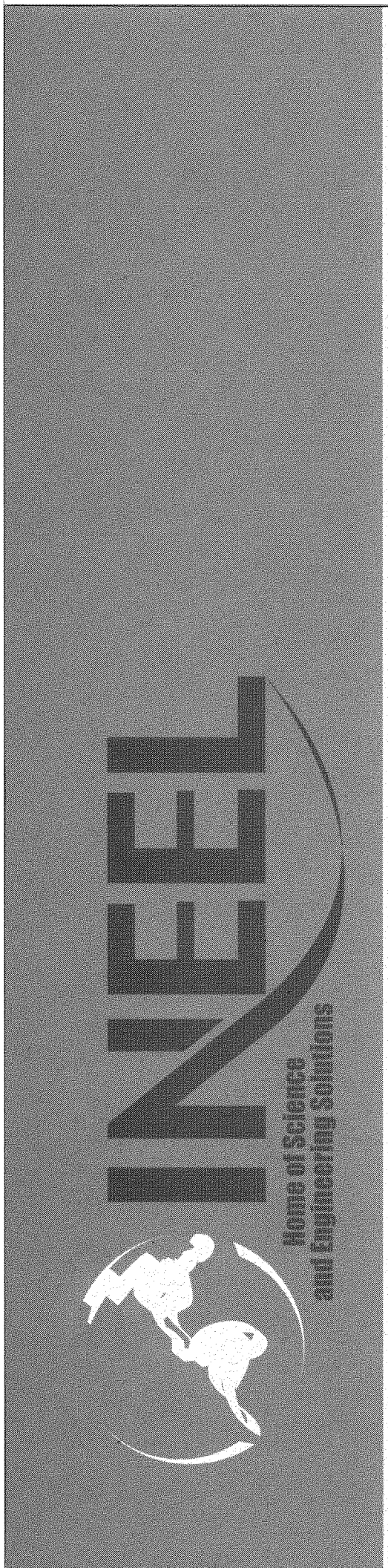
INEEL/EXT-99-00364
Revision 3

Health and Safety Plan for the Radioactive Waste Management Complex Cold Test Pits for OU 7-13/14

Larry R. Watson
Paul A. Sloan
October 2002



Idaho National Engineering and Environmental Laboratory
Bechtel BWXT Idaho, LLC

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Health and Safety Plan for the Radioactive Waste Management Complex Cold Test Pits for Operable Unit 7-13/14

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Paul A. Sloan

October 2002

Idaho National Engineering and Environmental Laboratory
Environmental Restoration Program
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
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Health and Safety Plan for the Radioactive Waste Management Complex Cold Test Pits for Operable Unit 7-13/14

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October 2002

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ABSTRACT

This health and safety plan establishes the procedures and requirements that will be used to eliminate or minimize health and safety risks to people working at the Radioactive Waste Management Complex cold (i.e., nonradioactive) test pits. The cold test pits are located in the Cold Test Pit South and the Cold Test Pit North areas, which are south and north of the Subsurface Disposal Area of the Radioactive Waste Management Complex, respectively. This health and safety plan contains information about the hazards involved in performing work at the cold test pits, as well as the specific actions and equipment that will be used to protect people while working at the task site.

The health and safety plan is intended to give safety and health professionals the flexibility to establish and modify site safety and health procedures throughout the entire span of normal operations at the cold test pits based on the existing and anticipated hazards. The body of this health and safety plan provides the core safety and health information for the normal maintenance and operation activities for the cold test pits. Task-specific information is provided in the appendixes to this health and safety plan.

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FIGURES

TABLES

ACRONYMS

BBWI	Bechtel BWXT Idaho, LLC
CFA	Central Facilities Area
CFR	Code of Federal Regulations
COCA	Consent Order and Compliance Agreement
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
CWA	controlled work area
dBA	decibel A-weighted
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
DWA	designated work area
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ERO	Emergency Response Organization
ES&H	environment, safety, and health
ES&H/QA	environment, safety, health, and quality assurance
FFA/CO	Federal Facility Agreement and Consent Order
FTL	field team leader
HASP	health and safety plan
HAZMAT	hazardous material
HAZWOPER	hazardous waste operations and emergency response
HEPA	high-efficiency particulate air
HSO	health and safety officer
IDLH	immediately dangerous to life or health
INEEL	Idaho National Engineering and Environmental Laboratory
ISG	in situ grouting
ISMS	Integrated Safety Management System

JSA	job safety analysis
TE	test engineer
MCP	management control procedure
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
OMP	Occupational Medical Program
OSHA	Occupational Safety and Health Administration
OTL	operations technical lead
OU	operable unit
PPE	personal protective equipment
PRD	program requirements document
RCRA	Resource Conservation and Recovery Act
RFP	Rocky Flats Plant
RI/FS	remedial investigation/feasibility study
RWMC	Radioactive Waste Management Complex
SCBA	self-contained breathing apparatus
SDA	Subsurface Disposal Area
STD	standard
STR	subcontract technical representative
SWP	safe work permit
TPR	technical procedure
TRAIN	Training Records and information Network
TRU	transuranic
TWA	time-weighted average
VPP	Voluntary Protection Program
WAG	waste area group
WCC	Warning Communications Center

Health and Safety Plan for the Radioactive Waste Management Complex Cold Test Pits for Operable Unit 7-13/14

1. INTRODUCTION

1.1 Purpose

This health and safety plan (HASP) establishes the procedures and requirements that will be used to eliminate or minimize health and safety risks to people working at the Radioactive Waste Management Complex (RWMC) cold (i.e., nonradioactive) test pits. The cold test pits are located in the Cold Test Pit South and the Cold Test Pit North areas, which are south and north of the Subsurface Disposal Area of the Radioactive Waste Management Complex, respectively. This health and safety plan contains information about the hazards involved in performing work at the cold test pits, as well as the specific actions and equipment that will be used to protect people while working at the task site.

This HASP is intended to give safety and health professionals the flexibility to establish and modify site safety and health procedures throughout the entire span of normal operations at the cold test pits based on the existing and anticipated hazards. The body of this health and safety plan provides the core safety and health information for the normal maintenance and operation activities for the cold test pits. Task-specific information is provided in the appendixes to this health and safety plan. Appendix B of this HASP applies to the OU 7-10 Glovebox Excavator Method Project mockup, which will be conducted during FY 2002 at Cold Test Pit South.

1.2 Scope

The work that will be performed under this HASP includes all site preparation and restoration, general housekeeping, and grounds maintenance of the cold test pits to ensure their availability as a geotechnical resource in support of the OU 7-13/14 comprehensive RI/FS.

The RWMC will be responsible for performing most phases of support work such as corrective maintenance on cold test pit support facilities and equipment, roads and ground maintenance, and transport of debris to the CFA landfill under the "Interface Agreement Between Radioactive Waste Management Complex and Environmental Restoration" (IAG-20) unless other work arrangements are made. Mobile cranes, forklifts, and other heavy equipment may be used during cold test pit operation. Appendixes to this HASP specific to tasks beyond normal cold test pit maintenance activities will be incorporated as these tasks are identified.

This HASP meets the requirements of the Occupational Safety and Health Administration (OSHA) Standard, 29 Code of Federal Regulations (CFR) 1910.120/1926.65, "Hazardous Waste Operations and Emergency Response (HAZWOPER)." The preparation of this HASP is consistent with information found in the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH 1985), INEEL safety and health manuals for fire protection and occupational health (Manuals 14a and 14b), the INEEL Radiological Control and Radiation Protection Manual (PRD-183), and the INEEL Emergency Plan and Resource Conservation and Recovery Act (RCRA) Contingency Plan (PLN-114).

This HASP governs all general activities at the cold test pits that will be performed by employees of Bechtel BWXT Idaho, LLC (BBWI), the current management and operating contractor for the U.S.

Department of Energy Idaho Operations Office (DOE-ID) at the INEEL; subcontractors to BBWI; and employees of other companies or U.S. Department of Energy (DOE) laboratories. The general activities include all site preparation and restoration, general housekeeping, and grounds maintenance of the cold test pits to ensure their availability as a geotechnical resource in support of the OU 7-13/14 comprehensive remedial investigation/feasibility study (RI/FS). Operable Unit 7-13/14 is the comprehensive OU for Waste Area Group 7, which comprises the RWMC. People not normally assigned to work at the site such as representatives of DOE, the State of Idaho, OSHA, and the U.S. Environmental Protection Agency (EPA) will be considered nonworkers who fall under the definition of "occasional site workers," as stated in the OSHA HAZWOPER standard (29 CFR 1910.120 and 1926.65).

This plan will be reviewed and revised by the health and safety officer (HSO) in conjunction with the field team leader and necessary environmental, safety, and health professionals, the INEEL Environmental Restoration (ER) Environment, Safety, and Health and Quality Assurance (ESH&QA) manager, or designee, to ensure the effectiveness and suitability of this HASP.

1.3 Additional Activities

Other work activities that may be performed prior to or during the performance of cold test pit project-specific activities include the following, as applicable:

- Prepare and obtain approval of National Environmental Policy Act documentation
- Prepare and establish hazard categorization determination
- Perform a Davis-Bacon determination
- Prepare and complete characterization sampling and analysis plan
- Prepare and initiate Integrated Safety Management System (ISMS) work controls, integrated planning sheets, job safety analyses, safe work permits, and other permits
- Prepare waste documentation
- Prepare and obtain approval of the Storm Water Prevention Plan, as necessary
- Prepare industrial hygiene exposure assessment
- Perform project- and site-specific crew training
- Mobilize equipment to project site
- Arrange for temporary power and telephone, as necessary
- Ensure that work site isolation and barriers are established
- Perform job site cleanup.

1.4 Idaho National Engineering and Environmental Laboratory Site Description

The INEEL is located in the northwestern portion of the Eastern Idaho Snake River Plain in southeast Idaho, located approximately 58 km (36 mi) west of Idaho Falls, Idaho (see Figure 1), and encompasses 2,305 km^2 (890 mi^2).

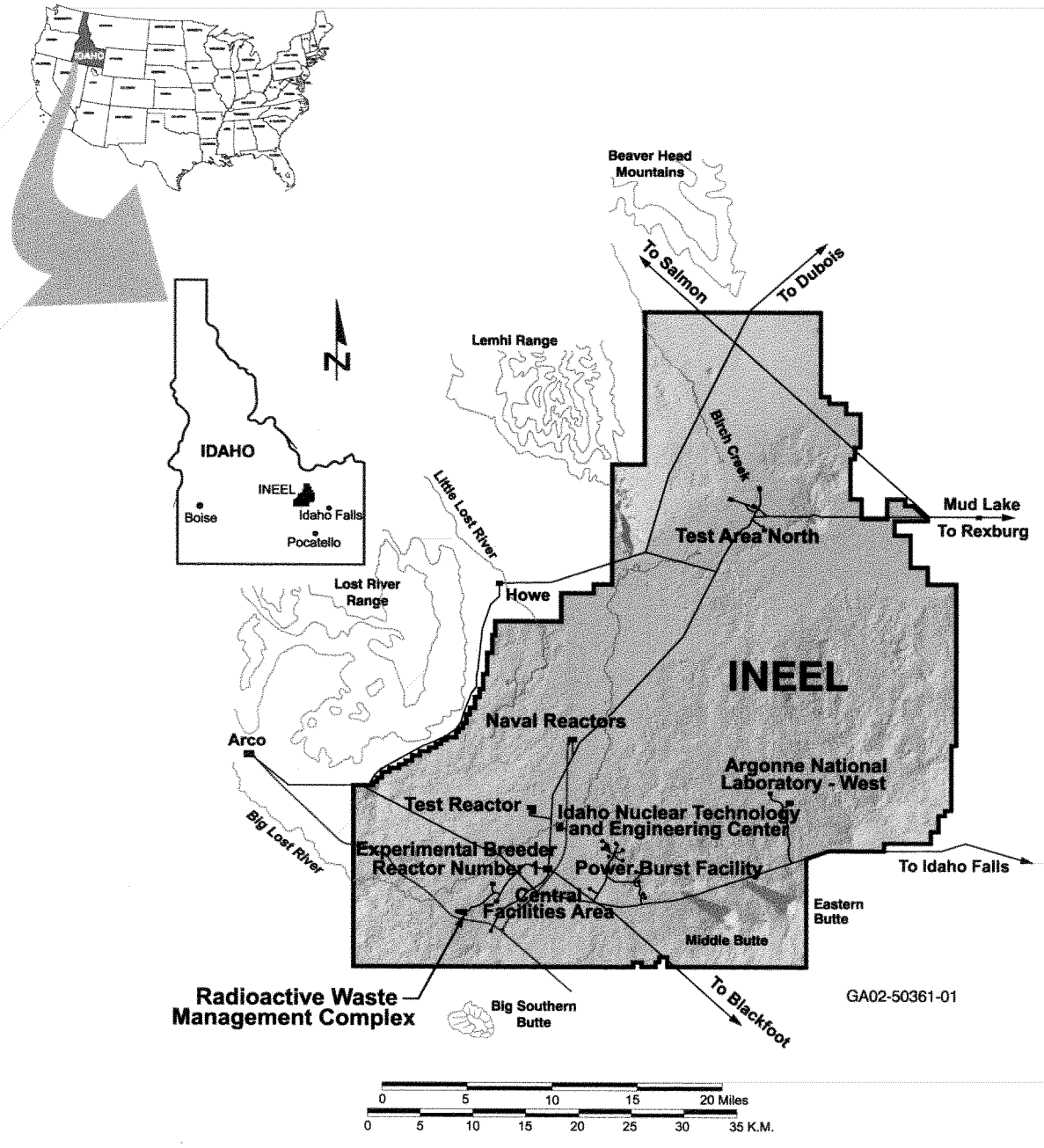

Figure 1. Map of Idaho National Engineering and Environmental Laboratory Site showing the location of the Radioactive Waste Management Complex.

The U.S. Atomic Energy Commission (now DOE) established the INEEL (originally called the National Reactor Testing Station) in 1949 as a site for building and testing a variety of nuclear facilities. The INEEL also has been the storage facility for transuranic (TRU) radionuclides and low-level radioactive waste since 1952. The INEEL currently supports the engineering and operations efforts of DOE and other federal agencies in areas of nuclear safety research, reactor development, reactor operations and training, nuclear defense materials production, waste management technology development, and energy technology and conservation programs. The responsibility for the INEEL rests with DOE, which also designates authority to government contractors to operate the INEEL. The current primary contractor for DOE-ID at the INEEL, BBWI, provides management and operating services to the majority of INEEL facilities.

In 1987, the *Consent Order and Compliance Agreement* (COCA) (DOE-ID 1987) was entered into between DOE and the EPA in accordance with the RCRA (42 USC § 6901 et seq., Section 3008[h]). The COCA required DOE to conduct an initial assessment and screening of all solid waste and hazardous waste disposal units at the INEEL and set up a process to conduct any necessary corrective actions. On July 14, 1989, the INEEL was proposed for listing on the National Priorities List (54 FR 29820). The listing was proposed by the EPA under the authorities granted to the EPA by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 USC § 9601 et seq.). The final rule that listed the INEEL on the National Priorities List was published on November 21, 1989 (54 FR 48184). As a result of having the INEEL on the National Priorities List, DOE, the State of Idaho and the EPA entered into the Federal Facility Agreement and Consent Order (FFA/CO) on December 9, 1991 (DOE-ID 1991). Under the FFA/CO, the INEEL was divided into 10 waste area groups (WAGs) further subdivided into OUs. The RWMC was designated as WAG 7 with 14 OUs. Operable Unit 7-13/14 combines the scope and schedule for the OU 7-13 TRU pits and trenches and the OU 7-14 comprehensive RI/FS.

1.5 Site Description

1.5.1 Radioactive Waste Management Complex and Subsurface Disposal Area Description

The RWMC is located in the southwestern portion of the INEEL, as shown in Figure 1. This area was established in the early 1950s as a disposal site for solid, low-level waste generated by INEEL operations. Within the RWMC is the Subsurface Disposal Area (SDA) (35.6 ha [88 acres]) where radioactive waste materials have been buried in underground pits, trenches, soil vault rows, one aboveground pad (Pad A), and the Transuranic Storage Area where interim storage TRU waste is in containers on asphalt pads. The TRU waste was disposed of in the SDA from 1954 to 1970. Rocky Flats Plant (RFP) TRU waste was received for disposal in the SDA from 1954 through 1970 (EG&G 1985). The RFP is a DOE-owned facility in Colorado[a] and was used primarily for the production of components for nuclear weapons.

In 1969, the U.S. Geological Survey began a study to determine the potential for radionuclide migration from the SDA buried waste (EG&G 1985), and contaminant migration studies are ongoing. Analytical results indicate that minute amounts of anthropic radionuclides may have migrated from the SDA toward the Snake River Plain Aquifer. The major studies used to develop the RI/FS rationale for WAG 7 are summarized in the *Work Plan for Operable Unit 7-13/14 Waste Area Group 7*

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a. The Rocky Flats Plant is located 26 km (16 mi) northwest of Denver. In the mid-1990s, it was renamed the Rocky Flats Environmental Technology site. In the late 1990s, it was again renamed, to its present name, the Rocky Flats Plant Closure Project.

Comprehensive Remedial Investigation/Feasibility Study (Becker et al. 1996). Historical investigations are also referenced and summarized in the *Interim Risk Assessment and Contaminant Screening for the Waste Area Group 7 Remedial Investigation* (Becker et al. 1998). The draft remedial investigation report for the OU 7-13/14 RI/FS provides up-to-date summaries of historical investigations conducted at the RWMC.[b]

The RWMC is located on the Snake River Plain in the gently rolling semiarid desert of southeastern Idaho. Surface topography of the region is determined by young basalt lava flows and associated volcanic features (e.g., cinder cones, vents, pressure ridges, and collapsed lava tubes). Average annual precipitation is 22 cm (8.7 in.). The depth-to-water table at the SDA is about 177 m (580 ft) (Becker et al. 1998).

Soil is shallow in the cold test pit areas (9 m [30 ft] maximum depth to basalt) and is composed of clay, silt, and sand. Soil mineralogy is predominately clay minerals (50 wt%), quartz (37.5 wt%), calcite (10 wt%), and iron oxyhydroxide and other minerals (2.5 wt%). Soil-moisture pH is alkaline (about 8 + 0.5). The soil pH is buffered by the calcite-water-to-CO2 interactions and by oxygen in the air. The soil moisture is saturated with respect to calcite, super-saturated with dolomite (Wood and Norrell 1996), iron minerals, and other soil minerals. Caliche, very common in the SDA, is a hard, impermeable, concrete-like soil naturally cemented by calcite.

The bedrock is a series of generally horizontal basalt lava flows separated by thin, discontinuous sedimentary interbeds. Consequently, the overall structure is analogous to a layer cake. The morphology of the basalt flows is highly variable from dense, massive material to vesicular and highly fractured rock. Lava tubes are common. The interbeds are primarily unconsolidated sediments, cinders, and volcanic breccia. Air permeability measurements (Weidner et al. 1992) indicate that the permeability varies through five orders of magnitude, from virtually infinite permeability to 0.05 darcy. Measurements of natural air-pressure fluctuation and attenuation, as a function of depth, indicate that the air permeability of the basaltic material sharply decreases at some depth between 22 and 32 m (72 and 105 ft) below ground surface. The material at depths less than 22 m (72 ft) is homogeneous in terms of air permeability, which also is the case for material below 32 m (105 ft).

1.5.2 Cold Test Pit Area Description

The cold test pits were constructed as nonhazardous, nonradioactive simulated waste pit areas and are used to demonstrate characterization, retrieval, and treatment technologies that may be useful for the remediation of buried waste. The simulated waste pits provide known targets and waste forms for accurate evaluation and calibration of procedures, technologies, and equipment. The mission for the cold test pits is to identify, evaluate, and demonstrate various innovative technologies for the remediation of radioactive and hazardous waste buried throughout the DOE complex. The pits were constructed in areas free of hazardous materials and radiological contaminants with soil characteristics and depths similar to the design and construction features of TRU waste pits and trenches located in the SDA.

Various temporary support structures including support trailers, wooden storage sheds, soft-sided tents (yurts), and cargo containers are used to support project activities. Minimal utilities are available at the cold test pits. Drinking water is supplied to support trailers by bottles or coolers. Chemical toilets are provided and serviced through a local contractor. Some areas within the cold test pit sites are supplied

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b. Holdren, K. Jean, Becker, Bruce H., Nancy L. Hampton, L. Don Koeppen, Swen O. Magnuson, T. J. Meyer, Gail L. Olson, and A. Jeffrey Sondrup, 2002, "Waste Area Group 7 Operable Unit 7-13/14 Pre-Draft Remedial Investigation and Baseline Risk Assessment (Draft)," DOE/ID-10995, Rev. C, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho, April 2002.

with power. When remote areas within the cost test pit boundaries require power, it is provided through the use of generators obtained and serviced through the Central Facilities Area (CFA) equipment pool. The locations of the two cold test pit areas near the SDA are shown in Figure 2.

1.5.2.1 Cold Test Pit South. Cold Test Pit South was established in 1988 and has been used for many treatability studies such as for in situ grouting (Loomis, Jessmore, and Weidner 2001). The area is located 183 m (200 yd) south of the RWMC boundary. Storage tanks, waste boxes, cardboard drums, and concrete culverts have been used as containers for simulated waste. Some containers from past studies remain buried there. A majority of the Cold Test Pit South area is open ground and covers approximately 4 ha (10 acres). Cold Test Pit South facilities, roads, and fences are shown in Figure 3.

1.5.2.2 Cold Test Pit North. The Cold Test Pit North area was established in 1999. It is the former site of the portable concrete batch plant for the Pit 9 technology demonstration activity conducted by Lockheed Martin Advanced Environmental Systems. This site is immediately west of the Pit 9 administration area (see Figure 2). The Cold Test Pit North facilities, roads, and fences are illustrated in Figure 4. Three-phase electrical power is available from the RWMC 12.5-kVA loop. Currently, the pit contains one test cell that was constructed to support the OU 7-13/14 in situ vitrification project (Farnsworth et al. 1999). Another cell, which has since been excavated and restored, was used to conduct the dynamic disruption test in 2001 (Shaw 2001). The cell used for the dynamic disruption test was located south of the existing cell.

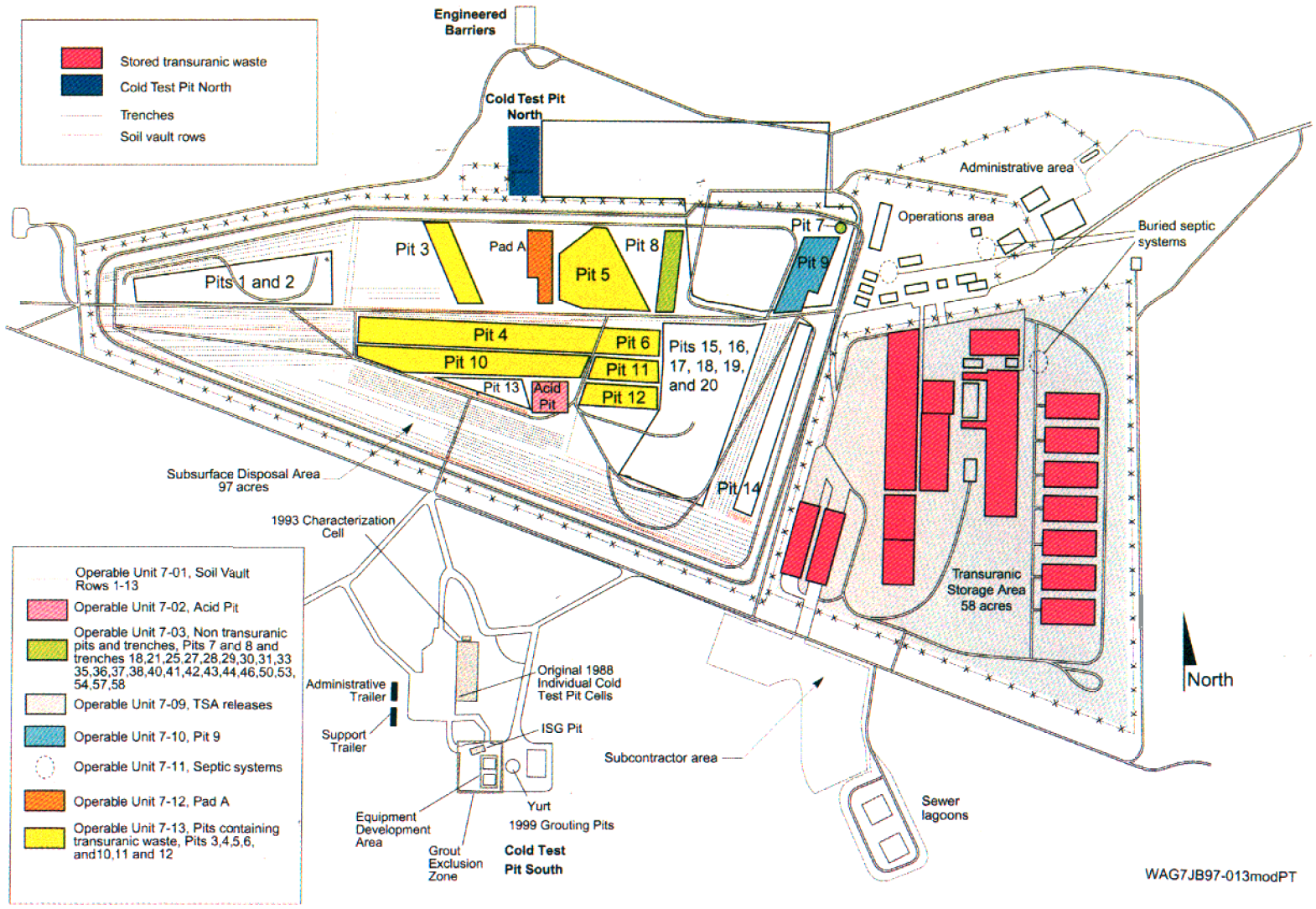

Figure 2. Map of the Radioactive Waste Management Complex showing the Subsurface Disposal Area, Cold Test Pit North, and Cold Test Pit South.

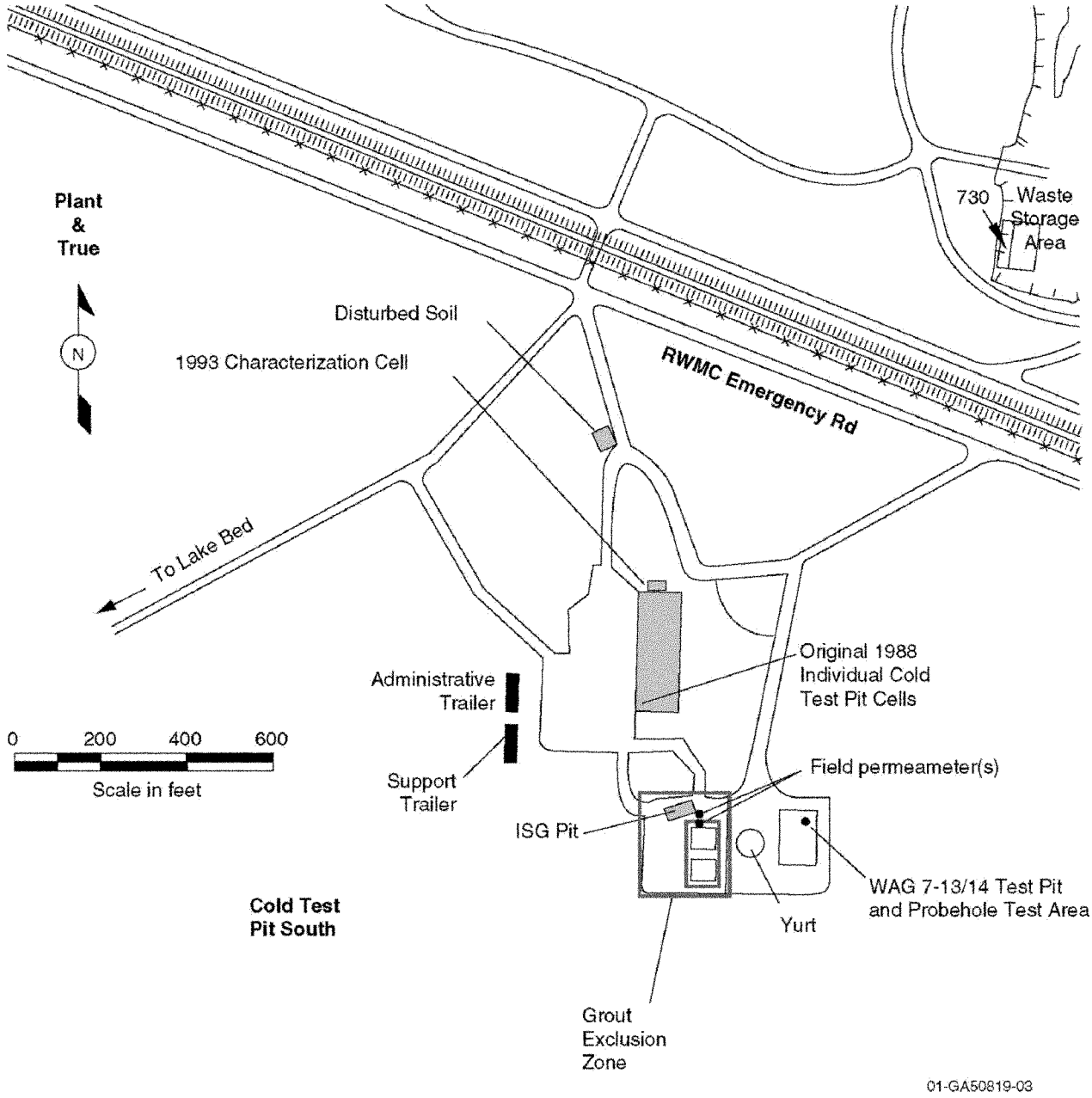

Figure 3. Map of Cold Test Pit South showing facilities, roads, and fences.

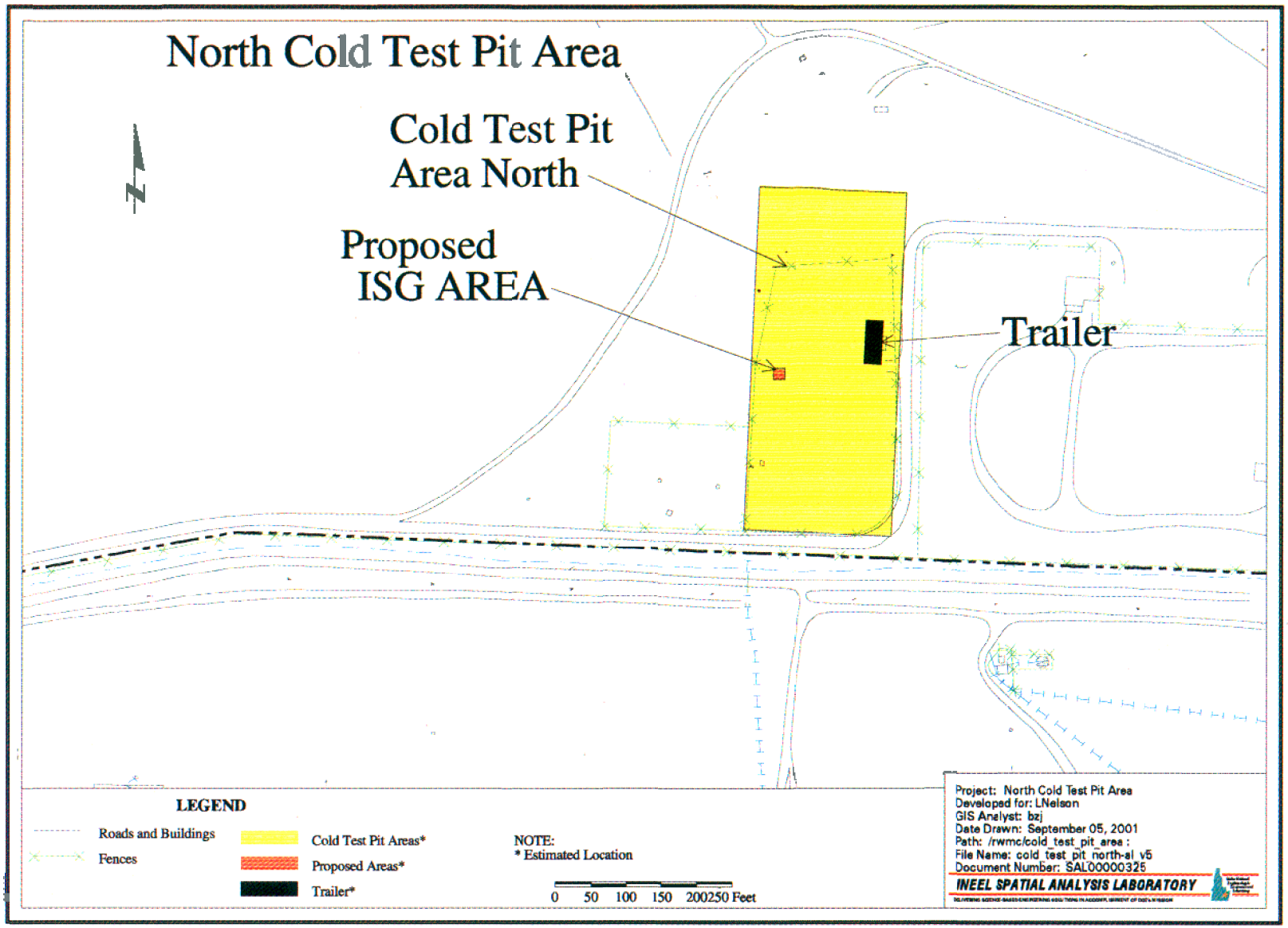

Figure 4. Map of the Cold Test Pit North showing facilities, roads, and fences.

2. KEY SITE PERSONNEL RESPONSIBILITIES

The organizational structure for this project reflects the resources and expertise required to perform the work while minimizing risks to worker health and safety, the environment, and the general public. The key roles at the task site and lines of responsibility and communication are shown on the organizational chart in Figure 5. Construction activities conducted at the task site will be under the direct authority and control of construction management personnel. Normal task site maintenance operations and project testing will be under the direct authority and control of ER field operations personnel. Appendixes identifying project specific organizational requirements beyond normal cold test pits construction, maintenance and test activities will be added to this HASP as they are identified. The following sections outline the responsibilities of key site personnel.

Task-site responsibilities included in this section may not be represented on all projects. Only those positions actually assigned to a given project will be represented for the project. Those positions defined and not represented on the project will be for reference only.

2.1 Environmental Restoration Specific Project Managers and Leads

Each specific project manager and lead is responsible for coordinating all document preparation and field, laboratory, and modeling activities. The specific project managers are responsible for the overall work scope, schedule, and budget of their projects. The specific project managers also are responsible for ensuring that Form 340.02, "Employee Job Function Evaluation," is (1) completed for all project employees, (2) reviewed by the project industrial hygienist for validation, and (3) submitted to the Occupational Medical Program (OMP) for determination of whether a medical evaluation is necessary. Each specific project manager ensures that all documentation (including logbook entries) is completed and submitted to ER Document Control at the completion of the project. Each specific project manager may use project technical support personnel to aid in coordination of field activities under the authority and supervision of site control personnel (field team leader [FTL], subcontract technical representative [STR], or Project Designee).

2.2 Long-Term Stewardship Operations Supervisor

The Long-Term Stewardship operations supervisor serves as the principal point of contact for the identification of resources to ensure the successful completion of maintenance, support, and project-specific activities.

2.3 Construction Coordinator

The construction coordinator is responsible for providing key information and decisions during project planning and designs concerning constructability issues and overall construction management and contracting strategies. The construction coordinator has primary responsibility for managing the construction phase of projects from design completion to construction closeout. Other responsibilities include the following:

- Managing progress on work packages for cost, schedule, and technical performance for the construction phase of the project
- Serving as point of contact for all safety issues

- Resolving claims and negotiating change orders (with appropriate input from the project manager, design team leader, purchasing, and the inspectors)

- Reviewing and monitoring the construction contractor schedule and overall performance and enforcing applicable contract requirements

- Coordinating dispute resolution between the contractor and BBWI.

2.4 Subcontract Technical Representative

The subcontract technical representative coordinates field activities at the cold test pits on behalf of the construction management organization. Health and safety issues must be brought to the attention of the STR. Specific responsibilities include the following:

- Enforce task-site control, document activities, and conduct project-specific plan-of-the-day and daily safety briefings at the start of each shift.

- Complete briefings and reviews in accordance with the requirements outlined in Management Control Procedure (MCP) -3003, "Performing Pre-Job Briefings and Post-Job Reviews." The STR will complete the job requirements checklist in accordance with Standard (STD) -101, "Integrated Work Control Process."

- Review and approve contractor invoices.

- Resolve claims and negotiate change orders (with appropriate input from the project manager, construction coordinator, design team leader, purchasing, and the inspectors).

- Enforcing terms and conditions of contracts.

- Enforce and coordinate environmental, safety, and health (ES&H) requirements and activities, and oversee compliance with the BBWI *Subcontractor Requirements Manual*.

- Manage emergency and accident response and coordination.

- Conduct ESH&QA inspections.

- Perform contract closeout.

- Coordinate and administer contract warranty issues.

- Participate in quality assurance reviews during design for construction feasibility issues.

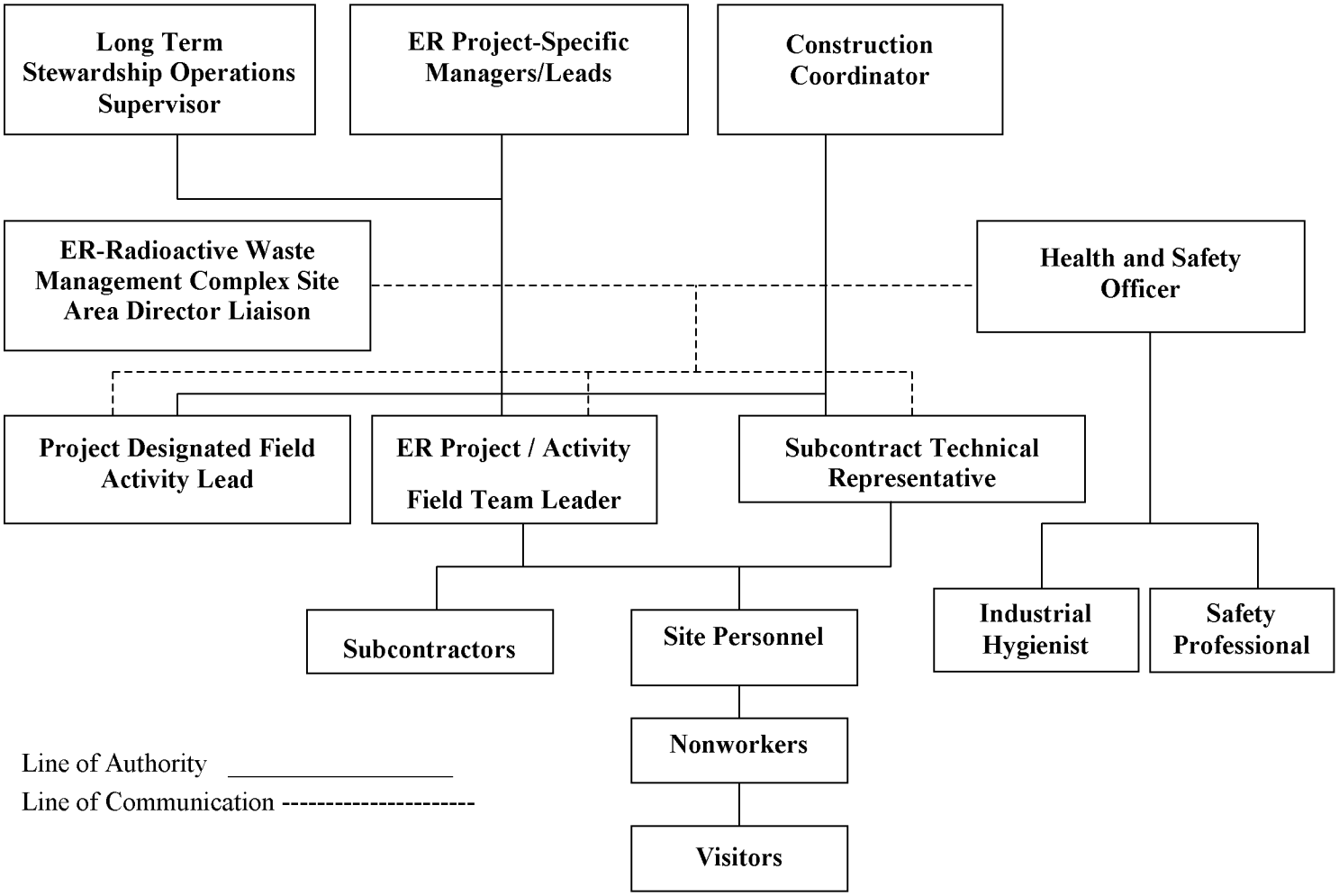

Figure 5. Operable Unit 7-13/14 Radioactive Waste Management Complex cold test pits organization chart.

2.5 Field Team Leader

The FTL coordinates normal task site maintenance and project field testing activities at the cold test pits on behalf of ER project-specific managers and leads. Health and safety issues must be brought to the attention of the field team leader. Specific responsibilities include the following:

- Enforce task-site control, document activities, and conduct project-specific plan-of-the-day and daily safety briefings at the start of each shift.
- Complete briefings and reviews in accordance with the requirements outlined in MCP-3003, "Performing Pre-Job Briefings and Post-Job Reviews." The FTL will complete the job requirements checklist in accordance with Standard-101, "Integrated Work Control Process."
- Manage emergency and accident response and coordination.
- Conduct ESH&QA inspections.
- Ensure compliance with waste management requirements and coordinate such activities with the environmental compliance coordinator or designee.

2.6 Project Designated Field Activity Lead

The project designated field activities lead coordinates project specific activities at the cold test pit when support by a field team leader or subcontract technical representative is not applicable. The project designee will direct project specific field activities at the cold test pits on behalf of ER project-specific managers as required. Health and safety issues must be brought to the attention of the project designee when utilized by ER management. Specific responsibilities include the following:

- Enforce task-site control, document activities, and conduct project-specific plan-of-the-day and daily safety briefings at the start of each shift.
- Complete briefings and reviews in accordance with the requirements outlined in MCP-3003, "Performing Pre-Job Briefings and Post-Job Reviews." The project designee will complete the job requirements checklist in accordance with STD-101, "Integrated Work Control Process," when applicable.
- Manage project site emergency and accident response and coordination.
- Conduct project ESH&QA inspections.
- Ensure compliance with waste management requirements and coordinate such activities with the environmental compliance coordinator or designee.

2.7 Environmental Restoration and Radioactive Waste Management Complex Site Area Director Liaison

The ER and RWMC site area director liaison serves as the point of contact for coordination between ER and the RWMC site area director on project-specific issues, as appropriate. The RWMC liaison provides advance notice to the site area director or designee of (1) scheduled activities including documents requiring RWMC review or approvals that impact site area operations and (2) site area operations that impact ER project activities.

2.8 Health and Safety Officer

The HSO serves as the primary point of contact for health and safety issues. The HSO is responsible for advising the field team leader, subcontract technical representative, or project designee on all aspects of health and safety and will be authorized to stop work at the site if any operation threatens worker or public health or safety. The HSO may be assigned other responsibilities, as stated in other sections of this HASP (see, for example, Sections 4.3, 5.1, and 7.2), as long as those other responsibilities do not interfere with the primary responsibilities of the HSO. The HSO will be authorized to verify compliance with this HASP; conduct inspections; require and monitor corrective actions; monitor decontamination procedures, if required; and require corrections, as appropriate. Environment, safety, and health professionals at the site support the HSO (e.g., the safety engineer, industrial hygienist, radiological control technician, radiological engineer, environmental coordinator, and facility representative), as necessary.

Individuals assigned as the HSO or alternate HSO must be qualified (in accordance with the OSHA definition) to recognize and evaluate hazards and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO also may act as the industrial hygienist, safety engineer, or in some cases the field team leader or subcontract technical representative,[c] additional site responsibilities requested of the HSO must not conflict[d] with the role of the HSO at the site.

If it is necessary for the HSO to leave the site, an alternate individual (e.g., field team leader, subcontract technical representative, or other knowledgeable person) will be appointed by the HSO to fulfill this role. The identity of the acting HSO will be recorded in the appropriate logbook and site personnel will be notified.

2.9 Environmental Restoration Environmental Compliance Coordinator

The assigned ER environmental compliance coordinator is responsible for overseeing, monitoring, and advising the field team leader and subcontract technical representative who are performing task-site activities on environmental issues and concerns by ensuring compliance with DOE orders, EPA regulations, and other regulations concerning the effects of task-site activities on the environment. The ER environmental compliance coordinator provides support surveillance services for hazardous waste storage and transport, waste disposal, and surface water and storm water run-off control. The ER environmental compliance coordinator must assist the field team leader, subcontract technical representative, or project designee in completing the job requirements checklist.

2.10 Task-Site Personnel

All task-site personnel, including INEEL, RWMC, and subcontractor personnel, must comply with the requirements of this HASP. The field team leader, subcontract technical representative, or project designee will brief project-specific personnel at the start of each working shift. During the prejob briefing, the following will be discussed: (1) all daily tasks, (2) associated hazards, (3) engineering and

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c. The specific duties depend on the hazards, complexity, and size of the activity involved, and required concurrence from the Environmental Restoration Environment, Safety, Health and Quality Assurance manager.

d. Additional responsibilities cannot conflict with the primary responsibilities of the health and safety officer, either philosophically or in terms of significant added volume of work.

administrative controls, (4) required personal protective equipment (PPE), (5) work control documents, and (6) emergency conditions and actions. Input from the project HSO, industrial hygienist, and radiological control personnel will be provided to clarify task health and safety requirements. All personnel will be encouraged to ask questions about site tasks and provide suggestions on ways to perform required tasks in a more safe and effective manner based on lessons learned from previous activities.

Once at the site, personnel will be responsible for identifying and reporting any potentially unsafe situations or conditions to the field team leader, subcontract technical representative, project designee, or the HSO for corrective action. If it is perceived that an unsafe condition poses an imminent danger, personnel will be authorized to stop work immediately and then notify the field team leader, subcontract technical representative, project designee, or the HSO of the unsafe condition.

2.11 Nonworkers

All people who may be on the site but are not part of the field team will be considered nonworkers for the purposes of this project (e.g., observers, administrative managers, guests, and other personnel not assigned to the project). Personnel will be considered "onsite" when they are present in or beyond the designated control zone. Nonworkers are deemed "occasional site workers" in accordance with the OSHA HAZWOPER standard (29 CFR 1910.120 and 1926.65) and must meet minimum training requirements for such workers and any additional site-specific training identified in Section 4. If the nature of a nonworker's task requires work within the control zone, then that nonworker must meet all the same training requirements as other field team members. A site representative must accompany all nonworkers until they have completed their 24-hour supervised field experience training.

2.12 Visitors

All visitors with official business at the task site, including INEEL personnel, representatives of DOE, and state or federal regulatory agencies, may not proceed beyond the control zone boundary without receiving project-specific HASP training. They must also sign the HASP training acknowledgment form, receive a safety briefing, wear appropriate PPE, and provide proof of meeting all training requirements, as specified in Section 4.

A fully trained site representative will escort visitors (e.g., field team leader, subcontract technical representative, HSO, or a qualified designated alternate) at all times while on the site.

A casual visitor to the site is a person who does not have a specific task to perform or other official business to conduct at the site. Casual visitors will not be permitted on the site.

2.13 Industrial Hygienist

The assigned INEEL industrial hygienist is the primary source for information for nonradiological, hazardous, and toxic agents at the site. The industrial hygienist is responsible for assessing the potential for worker exposures to hazardous agents in accordance with the companywide safety and health manuals, MCPs, and accepted industry industrial hygienist practices and protocol. During participation in site characterization activities, the industrial hygienist is responsible for performing the following activities:

- Assessing and recommending appropriate hazard controls for the protection of task-site personnel

- Operating and maintaining airborne sampling and monitoring equipment
- Reviewing PPE for effectiveness
- Assessing and recommending the use of PPE required in this HASP
- Recommending changes to PPE requirements, as appropriate.

The industrial hygienist also must review all relevant employee job function evaluation forms (Form 340.02, "Employee Job Function Evaluation") to validate management's completion of the form. After validation, the form will be sent to the OMP for scheduling of a medical evaluation, as needed.

Following an evacuation, the industrial hygienist in conjunction with other recovery team members will assist the field team leader, subcontract technical representative, or project designee in determining whether conditions exist for safe site reentry. Personnel showing health effects (e.g., signs and symptoms) resulting from possible exposure to hazardous agents will be referred to an OMP physician by the industrial hygienist, the industrial hygienist' supervisor, or the HSO. The industrial hygienist may have other duties at the site as specified in other sections of this HASP, in program requirements documents (PRDs), or in MCPs. During emergencies involving hazardous materials (HAZMATs), airborne sampling and monitoring results will be coordinated with members of the Emergency Response Organization (ERO).

2.14 Safety Professional

The assigned INEEL safety engineer will review work packages; observe task-site activity; assess compliance with the INEEL safety and health manuals for fire protection and occupational health (Manuals14a and 14b); coordinate with other ES&H disciplines as required; sign safe work permits (SWPs); advise the field team leader, subcontract technical representative, or project designee on required safety equipment; answer questions on safety issues and concerns; and recommend solutions to safety issues and concerns that arise at the site. The safety engineer may have other duties at the site, as specified in other sections of the HASP or in PRDs and MCPs.

3. RECORD-KEEPING REQUIREMENTS

Environmental Restoration Document Control is required to organize and maintain data and reports generated by ER field activities. Environmental Restoration Document Control maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Environmental Restoration Document Control maintains copies of the project plans for ER, this HASP, the "Environmental Restoration Project Management Plan" (Plan [PLN]-694), the Quality Assurance Project Plan (DOE-ID 2000), and other project-specific documents in the project file. All other project records and logbooks, except industrial hygiene logbooks, must be forwarded to Administrative Record and Document Control within 30 days after completion of field activities.

3.1 Industrial Hygiene Monitoring Records

The industrial hygienist must record airborne monitoring and sampling data (both area and personal) on the INEEL industrial hygiene system. All monitoring and sampling equipment will be maintained and calibrated in accordance with INEEL procedures and the manufacturer's specifications. Industrial hygiene airborne monitoring and sampling data will be treated as limited access information and will be maintained by the industrial hygienist in accordance with companywide safety and health manual procedures. Any airborne monitoring or sampling done by nonindustrial hygiene and safety personnel will be documented in a project-controlled logbook, which will be reviewed by the industrial hygienist.

Task-site personnel or their representatives have a right to both industrial hygiene monitoring and sampling (both area and personal) data.

3.2 Documentation of Field Activities and Site Attendance

Documentation of field construction activities under the direction of the STR will be maintained on Form 540.23, "Subcontractor Daily Report." Documentation of cold test pit maintenance and field test activities under the direction of the FTL or project designee will be maintained in accordance with MCP-231, "Logbooks for ER and D&D&D Projects." The field team leader will keep a record of daily project-specific events in the field team leader logbook. An assigned project designee will keep a record of daily project-specific events in appropriate logbooks as required above.

Site attendance will be documented at the cold test pits for all activities and will contain an accurate record of all personnel (e.g., workers and nonworkers) who are onsite each day.

Project activities at cold test pit areas will maintain project-specific site attendance logbooks as well as logbooks for documentation of field activities. When project-specific logbooks are in effect, project-specific personnel will not be required to sign in on the general cold test pit maintenance and operations site attendance logbook.

Logbooks must be obtained from ER Document Control. Completed logbooks are submitted to ER Document Control, along with other project-specific documents at project completion.

4. PERSONNEL TRAINING

All work-site personnel will receive training as specified by 29 CFR 1910.120 and 1926.65 and the INEEL safety and health manuals. Table 1 provides a summary of training requirements for task-site personnel for normal cold test pit work. Specific training requirements for each worker may vary depending on the hazards associated with their project-specific job assignment. Appendixes will be added to this HASP as project-specific tasks (beyond normal cold test pit maintenance activities) are identified.

4.1 General Training

Proof that all required training has been completed (including applicable refresher training) must be maintained at the site or made available electronically. Examples of acceptable written training documents include the "40-hour or 24-hour OSHA HAZWOPER Card," "Respirator Authorization Card," "Medic/First-Aid Training Card," and a copy of an individual's or department's Training Records and Information Network (TRAIN) printout demonstrating completion of training. For subcontractors, a copy of a certificate and card issued by the institution where the site-specific required training was received also is acceptable proof of training.

4.2 Site-Specific Project Training

Before beginning work at the task site, project site-specific training will be conducted by the field team leader, subcontract technical representative, or designee. This training will consist of a complete review of this HASP and attachments, job safety analysis, SWPs, and other applicable work control documents. Each training session will include time for discussion and questions. At the time of training, personnel training records will be checked and verified to be current and complete for all required training shown in Table 1. Upon completing project site-specific training, personnel will sign Form 361.25, "Group Read & Sign Training Form," indicating that they have received this training, understand the project tasks, associated hazards and mitigation, and agree to follow the OU 7-13/14 HASP and all other applicable work control and safety requirements.

For tasks requiring Hazwoper training, the HSO, field team leader, subcontract technical representative, or project designee will monitor each newly 40-hour trained worker's performance to meet the requirement for 24 hours of supervised field experience in accordance with 29 CFR 1910.120(e) and 29 CFR 1926.65(e). Form 361.47, "Supervised Field Experience Verification" will be completed. This will satisfy the HAZWOPER initial 24-hour supervised field experience. For the 24-hour trained HAZWOPER workers, the same procedure will be followed except the supervised field experience will last only 8 hours.

The training records will be forwarded to the ER training coordinator at Mail Stop 3915 and the RWMC training coordinator (as applicable) for retention in the employee training records system (TRAIN).

4.3 Daily Plan-of-the-Day Briefing and Lessons Learned

The HSO, field team leader, subcontract technical representative, or project designee, as applicable, will conduct a daily plan-of-the-day safety briefing when work is scheduled at the cold test pits. During this briefing, daily tasks will be outlined, hazards identified, hazard controls and work zones established, PPE requirements discussed, and employees' questions answered. At the completion of this briefing, work control documents will be read and signed such as work orders, all SWPs, and all job safety analyses. Particular emphasis will be placed on lessons learned from the activities of the previous day and how tasks can be completed in the safest, most efficient manner. All personnel will be asked to contribute ideas to enhance worker safety and mitigate potential exposures at the project task site.

Table 1. Required training for site personnel.

Training	Field Team Leader, Subcontract Technical Representative, Health and Safety Officer	Field Team (Required)	Nonworkers[a] (Required)	Visitors[b] (Required)
Site-specific training[c]	X	X	X [d]	X [d]
Hazard communication[e]	X	X	X	X
Fire extinguisher training	X	—	—	—
Site control and warning devices[e]	X	X	X	X
HASP emergency response plan (see Section 11)[e]	X	X	X	X
40-hour HAZWOPER[f]	X [d]	X [d]	—	—
8-hour HAZWOPER site supervisor	X [d]	—	—	—
24-hour HAZWOPER occasional worker	—	X [d]	X [d]	X [d]
Hearing conservation	X [g]	X [g]	X [g]	X [g]
Confined space	X [g]	X [g]	X [g]	X [g]
Cardiopulmonary resuscitation and medic first aid[h]	X	—	—	—
Respirator qualification and fit test	X [i]	X [i]	—	—
HAZMAT employee general awareness training	X [j]	X [j]	X [j]	—

a. Nonworkers (occasional site workers) who must enter the control zone are required to have training necessary to perform their assigned tasks.

b. Visitors are required to meet the nonworker training requirements, at a minimum, if they enter the control zone.

c. Training will be documented using training acknowledgment forms (e.g., site-specific training Form 361.25, "Group Read & Sign Training Roster," and Form 361.47, "Hazardous Waste Operations (Hazwoper) Supervised Field Experience Verification 29 CFR 1910.120").

d. This training requirement is based on project duties and site zone access requirements, as determined applicable in accordance with 29 CFR 1910.120 by the health and safety officer (HSO) and project manager or lead.

e. This topic will be included in site-specific training.

f. This training includes 40 hours of classroom instruction and 24 hours of supervised field experience.

g. This training will be based on individual requirements for the specific project, as determined by the HSO.

h. One medic first-aid and cardiopulmonary resuscitation (CPR) -qualified individual must be present during all cold test pit activities. Project activity tasks beyond normal cold test pit maintenance activities will require two medic first-aid and CPR-qualified individuals onsite during project-specific activities.

i. This training is required only if areas requiring respirator use will be entered.

j. This training is required only if the employee is identified as a "HAZMAT" employee (i.e., anyone who directly affects hazardous material transportation safety by handling, packaging, labeling, loading, unloading, moving, or driving (in accordance with 49 CFR 171.8).

HAZWOPER = hazardous waste operations and emergency response HAZMAT = hazardous material
HASP = health and safety plan

5. OCCUPATIONAL MEDICAL SURVEILLANCE PROGRAM

Minimal handling of packaged hazardous materials and no hazardous waste handling will occur as a part of the cold test pit activities. No contaminants (listed in 29 CFR Subpart Z) with substance-specific standards have been identified at the project site. If any new contaminants of concern are identified during the course of normal cold test pit maintenance or operations, exposures will be evaluated and quantified to determine whether a substance-specific standard and associated medical surveillance requirements apply. If regulatory-mandated substance-specific standard action levels are triggered, then affected personnel will be enrolled in applicable medical surveillance programs. Employee exposures are not expected to require medical surveillance with the exception of noise. Appendixes to this HASP addressing OMP issues specific to project tasks beyond normal cold test pit maintenance activities will be incorporated as these tasks are identified.

5.1 Injuries on the Site

According to INEEL policy, an OMP physician will examine all injured personnel under the following conditions:

- If an employee is injured on the job
- If an employee is experiencing signs and symptoms consistent with exposure to a hazardous material
- If there is reason to believe that an employee has been exposed to toxic substances or physical or radiological agents in excess of allowable limits.

Note: *Subcontractor employees will be taken to the closest INEEL medical facility to have an injury stabilized before being transported to the subcontractor's treating physician or medical facility.*

In the event of a known or suspected injury or illness because of exposure to a hazardous substance or physical agent, the employee will be transported to the nearest INEEL medical facility for evaluation and treatment, as necessary. The project manager, HSO, field team leader, subcontract technical representative, or assigned designee will be responsible for obtaining as much of the following information as possible to accompany the individual to the medical facility:

- Name, job title, work (site) location, and supervisor's name and telephone number
- Substances and physical agents (known or suspected) and material safety data sheet, if available
- Date of employee's first known exposure to the substance or physical agent
- Locations, dates, and results of any airborne exposure monitoring or sampling
- Personal protective equipment in use during this work (e.g., type of respirator and cartridge used)
- Number of days per month PPE has been used
- Anticipated future exposure to the substance or physical agent.

Further medical evaluation will be determined by the examining and treating physician according to the signs and symptoms observed, hazard involved, exposure level, and specific medical surveillance requirements established by the OMP director, in compliance with the OSHA HAZWOPER standard (29 CFR 1910.120 and 1926.65).

As soon as possible after an injured employee has been transported to the INEEL medical facility, the field team leader, subcontract technical representative, project manager, or assigned designee will make proper notifications.

6. ACCIDENT AND EXPOSURE PREVENTION PROGRAM

Cold test pit activities present numerous potential physical hazards to personnel conducting the required tasks. All personnel must understand and follow the task-specific requirements of this HASP. Engineering controls, hazard isolation, specialized work practices, and the use of PPE will be implemented to eliminate or mitigate potential hazards and exposures. However, all personnel on the site must play their role in the identification and control of hazards.

6.1 Voluntary Protection Program and Integrated Safety Management

The INEEL safety process embraces the Voluntary Protection Program (VPP) and ISMS criteria, principles, and concepts to identify and mitigate hazards, thereby preventing accidents. All levels of management and workers are responsible for implementing safety policies and programs and for maintaining a safe and healthy work environment. Project personnel and subcontractors are expected to take a proactive role in preventing accidents; ensuring safe working conditions for themselves and fellow personnel; and complying with all work control documents and approved procedures.

The ISMS is focused on the system side of conducting operations, and VPP concentrates on the people aspect of conducting work. Both programs define work scope, identify and analyze hazards, and mitigate the hazards. Additional information on these programs is available on the INEEL Intranet. Bechtel BWXT Idaho, LLC (current primary management and operating contractor) and its subcontractors participate in VPP and ISMS for the safety of their employees. This document includes all elements of both systems. The five key elements of VPP and ISMS and their corresponding HASP sections are as follows:

Voluntary Protection Program	Integrated Safety Management System	Health and Safety Plan Section
—	Define work scope	Section 1
Work site analysis	Analyze hazards	Section 5, 8, and 9
Hazard prevention and control	Develop and implement controls	Section 6, 7, 8, 9, 10, and 11
Safety and health training	Perform within work controls	Section 4
Employee involvement	Perform work within controls	Section 6 and 8
Management leadership	Provide feedback and improvement	Section 2 and 4

6.2 General Safe-Work Practices

The following procedures are mandatory for all INEEL and subcontractor personnel working on the site. All site visitors entering the site area (i.e., control zone and beyond) must follow these procedures. Failure to follow these practices may result in permanent removal from the site and other disciplinary actions. The project manager, field team leader, subcontract technical representative, or assigned designee, and the HSO are responsible for ensuring that the following hazard-control practices are followed at the site:

- Limiting access to authorized INEEL, subcontractor, and visitor personnel only.
- Ensuring that all personnel have the authority to initiate STOP WORK actions. Use MCP-553, "Stop Work Authority."

- Ensuring that absolutely no eating, drinking, chewing gum or tobacco, smoking, applying cosmetics, or any other practice occurs that increases the probability of hand-to-mouth transfer and ingestion of materials, except in a designated area.

- Being aware of and complying with all safety signs, color codes, and barriers and adhering to PRD-5117, "Accident Prevention Signs, Tags, Barriers, and Color Codes."

- Being alert for dangerous situations, strong or irritating odors, airborne dust or vapors, and broken containers, and reporting all potentially dangerous situations to the project manager, field team leader (or assigned designee), or the HSO.

- Maintaining appropriate spill kits or other containment and absorbent materials at the work site.

- Preventing releases of hazardous materials including those used at the work site; containing (if possible to do so safely) and reporting any spills to the HSO, field team leader, or job-site supervisor (and facility representative where applicable); taking steps to clean up any spills in accordance with the appropriate procedure (e.g., activating the emergency preparedness procedures for the area); and notifying the spill-notification team (at Pager No. 6400) when any hazardous spill occurs. (See Section 11 for more details on the spill-response plan for the work site.)

- Being familiar with the physical characteristics of the site including, but not limited to, the following conditions:

  - Wind direction

  - Accessibility of fellow personnel, equipment, and vehicles

  - Communications at the site and with other nearby facilities

  - Major roads and means of access to and from the site

  - Nearest water sources and fire fighting equipment

  - Warning devices and alarms

  - Capabilities and location of nearest emergency assistance.

- Evaluating tasks when wind speeds reach 25 mph or greater, or gusts of 35 mph or greater, by the HSO, radiological control technician, or industrial hygienist for potential work stoppage.

- Locating eyewash stations in the staging areas.

- Meeting applicable regulations for electrical equipment, wiring, cables, switches, and current-overload protection and maintaining them in a manner that provides protection for project personnel from shock hazards and injury and prevents property damage. Providing ground-fault protection whenever outdoor electrical equipment is used also is required.

- Keeping all ignition sources at least 15 m (50 ft) from explosive or flammable environments and using nonsparking, explosion-proof equipment, if advised to use such equipment by a safety professional.

- Implementing the "buddy system" when working in site control zones for all work other than area monitoring and general surveillance activities (see Section 6.4).

- Complying with PRD-5121, "Personal Protective Equipment," for personnel wearing contact lenses.

6.2.1 External Chemical Exposure

Bulk chemicals represent sources for external chemical exposures at the site. Basic protective measures used to reduce external exposure include (1) minimizing time for mixing, (2) maximizing the distance from the source of chemicals, and (3) using adequate ventilation whenever possible. The following are methods to minimize external exposure.

6.2.1.1 Methods for Maximizing Distance from Chemicals. Workers will maintain safe distances from and minimize exposure to chemicals by:

- Using remote operational controls when appropriate

- Working upwind from the source of chemicals

- Using only the amount of chemicals needed.

6.2.1.2 Proper Use of Shielding. Workers will ensure that they are shielded from hazardous weather conditions and harmful substances by the following:

- Taking advantage of the site equipment and enclosures (e.g., wind screens and shields)

- Wearing safety glasses, face shield, or full-face respirator (depending on the task) to protect eyes from chemical splashes, spills, or vapors.

6.2.2 Internal Chemical Exposure

Chemicals can enter the body through inhalation, ingestion, absorption through wounds, or injection from a puncture wound. Workers will minimize internal chemical exposure by the following:

- Wearing respiratory protection required for the task, performing all leak checks, and inspecting all PPE prior to entering contaminated areas

- Reviewing the SWP, contamination sources, and locations and minimizing or avoiding activities in those areas

- Using portable ventilation and filter equipment when working with or mixing dust or chemical particles

- Not touching the face (adjusting glasses or PPE) or other exposed skin with contaminated gloves

- Following all posted instructions and removing PPE, as prescribed, when exiting contaminated areas and asking the industrial hygienist or HSO for assistance if questions arise

- Washing hands and face before eating, drinking, smoking, or other activity that may provide a pathway for contaminants.

6.3 Nonradiological Contaminant Exposure Avoidance

The waste in the cold test pits will be a simulated waste containing nonradiological constituents (e.g., organic and inorganic chemicals and hazardous materials). The same potential exposure pathways that exist for radionuclide contamination apply equally to nonradionuclide contaminants. Project-specific nonradionuclide contaminants will be documented in the project-specific appendixes. Each contaminant has distinct physical, chemical, and mechanical properties that determine its toxicity. Threshold limit values have been established to provide guidelines in evaluating airborne and skin exposure to these chemicals and materials. They represent levels and conditions under which it is believed that nearly all workers may be exposed day after day without adverse health effects.

The engineering controls normally employed to eliminate or mitigate airborne radioactivity will serve to control nonradiological airborne contaminants. Every effort will be made to isolate the source of these hazards through engineering controls and containment, where feasible. Some of these contaminants pose other exposure hazards from contact and skin absorption; thus, implementing avoidance practices minimizes the potential for exposure. Exposure avoidance at the site may include the following:

- Ensuring ventilation systems are operating as necessary when sources must be opened or handled
- Collecting bags to isolate the source of contamination
- Wearing all required PPE, inspecting all pieces before donning, and taping all seams
- Changing gloves frequently (when soiled) to prevent the spread of contamination
- Changing PPE if it becomes damaged or soiled with source contaminant material (e.g., sludge and waste residue)
- Containerizing samples to avoid handling twice
- Minimizing time in known or suspected contamination areas (e.g., vapors, sludge, and waste residue)
- Washing hands and face before eating, drinking, smoking, or another activity that may provide a pathway for contaminants.

6.4 Buddy System

The two-person buddy system will be used in the work site control zones for all work other than area monitoring and general surveillance activities. This system is to ensure that each worker's mental and physical well-being is monitored during the course of the day. Workers need to be able to see or hear and effectively communicate with their buddy at all times, when in the control zone. Everyone should watch for signs and symptoms of illness or injury in their assigned buddy. A buddy must be able to perform the following tasks:

- Provide assistance
- Verify the integrity of the PPE
- Observe their partner for signs and symptoms of heat stress, cold stress, or contaminant exposure
- Notify other personnel in the control zone, if emergency assistance is needed.

7. SITE CONTROL AND SECURITY

This HASP is designed to support the typical work performed to maintain the cold test pits. Site control and security requirements specific to project tasks beyond normal cold test pit maintenance activities will be added as appendixes to this HASP, as these tasks are identified. Entry into and exit out of site designated work areas will be controlled through the appropriate use of barriers, signs, and other measures in accordance with PRD-2022, "Safety Signs, Color Codes, and Barriers," or PRD-5117, "Accident Prevention Signs, Tags, Barriers, and Color Codes." Personnel not directly involved with activities will be excluded from entering designated work areas. Non-field team members, such as inspectors, may be admitted to the site provided they are on official business authorized by the HSO and have met all the site-specific training requirements for the area they have a demonstrated need to access, as shown in Table 1.

The HSO and safety professional should be consulted regarding equipment layout at the project site (in conjunction with the subcontractor superintendent for subcontractor-owned equipment) to minimize personnel hazards from equipment. The focus should be on equipment with stored energy (electrical, pressurized systems, elevated materials and equipment, and chemical), moving and rotating parts (equipment that is guarded and that has open rotating parts such as a drill rig), and other equipment with the potential to result in personnel injuries from being struck-by, caught-between, or entangled in such equipment. The layout of equipment at the project site should reflect the nature of the hazard presented and should be mitigated through the use of engineering controls (e.g., barriers, guards, and isolation), administrative controls (roped off restricted areas or controlled entry access), and qualifications of operators and those assisting in the operation of the equipment, when required.

Good housekeeping will be maintained at all times during the course of the project to include maintaining working and walking surfaces to minimize tripping hazards, stacking or storing materials and equipment in a centralized location when not in use, and regular cleanup of debris and trash that may accumulate at the project site.

Based on the nature of the normal cold test pit maintenance and operations tasks to be completed, a graded approach with two types of site control designations will be used based on the potential hazards, complexity of work tasks, and duration of project tasks. The two types of work areas are the following:

- Designated work areas (DWAs) (established for low-hazard routine cold test pits maintenance and operations tasks)

OR

- Controlled work areas (CWAs) (established for higher hazard tasks).

The primary differences between the work areas will be the size of the area, method of delineation, and postings as determined by the activity being conducted and associated hazards. The determination of what type of work area will be established will be made by the HSO in conjunction with the field team leader, subcontract technical representative, or project designee.

Construction personnel may be used to perform maintenance activities at the cold test pits such as area contouring. A construction area will be established for all construction tasks at the project site.

7.1 Designated Work Area

The DWAs established for the cold test pit maintenance and operational tasks will consist of the general areas currently located inside the fenced cold test pit perimeters. This type of work area will be established where a more restrictive designated work area would not lend itself to the short duration low hazard activities associated with cold test pit maintenance and operations. The boundary of a DWA established within the fenced perimeters will typically be marked with cones or stanchions and generally will not be delineated with rope or ribbon or include other demarcation. All personnel who enter the DWA will wear the appropriate level of PPE for the degree and type of hazards present, as listed in Section 9. All DWAs will be delineated and posted with the appropriate signage based on the hazard being controlled, in accordance with PRD-5117 or PRD-2022.

Support facilities and equipment (e.g., project administrative trailer, vehicle parking, additional emergency equipment, extra PPE, and stored monitoring and sampling equipment) will generally be excluded from the DWA. Visitors who do not have appropriate training or PPE to access the DWA will be restricted from entering.

7.2 Controlled Work Area

The CWAs will be large enough to encompass the equipment and nature of the tasks being conducted to prevent personnel not assigned to the project task and visitors from being exposed to potential safety and health hazards associated with the project tasks. This type of work area will be established where a more restrictive area is required based on increased hazards associated with activities that may include higher hazards. The boundary of the CWA typically will be marked with a combination of stanchions or posts and delineated with rope or ribbon and include warning signs (e.g., construction area) or other demarcation. Only the minimum number of personnel required to safely perform the project tasks will be allowed into the CWA. The CWA is a controlled area during all project tasks and an entry and exit point will be established at the periphery of the CWA to regulate the flow of personnel and equipment. All personnel who enter the CWA will wear the appropriate level of PPE for the degree and type of hazards present, as listed in Section 9.

Factors that will be considered when establishing the CWA boundary include (1) air monitoring data, (2) equipment in use, and (3) the physical area necessary to conduct site operations. The boundary may be expanded or contracted, as this information becomes available, based on the aforementioned factors. The HSO, in conjunction with the safety professional and industrial hygienist, will establish the CWAs. Based on the hazard being controlled, all CWAs will be delineated and posted with the appropriate signage in accordance with PRD-5117 or PRD-2022.

7.3 Construction Area

Construction areas will be large enough to encompass the equipment and nature of the project tasks being conducted to prevent personnel not assigned to the project and visitors from being exposed to potential safety and health hazards associated with the construction tasks. This type of work area will be established where access to the more restrictive construction area is required based on the task hazards determination associated with construction activities. The boundary of the construction area will typically be marked with a combination of stanchions or posts and delineated with rope or ribbon and include warning signs (e.g., construction area) or other demarcation. Only the minimum number of personnel required to safely perform the project tasks will be allowed into the construction area. The area will be controlled at all times. Also, entry and exit points will be established to regulate the flow of personnel and equipment. All personnel who enter the construction area will wear the appropriate level of PPE for the degree and type of hazards present (see Section 9).

Factors that may be considered when establishing the construction area boundary include (1) air monitoring data, (2) equipment in use, and (3) the physical area necessary to conduct site operations. Based on the factors listed above, the boundary may be expanded or contracted as this information becomes available. The HSO, in conjunction with the safety professional and industrial hygienist, will establish the boundary. All CWAs will be delineated and posted with the appropriate signage based on the hazard being controlled and in accordance with PRD-2022.

Note: *The safety professional and industrial hygienist will assist the HSO in establishing the access requirements for the truck or heavy equipment traffic routes, designated work areas, and for the project-based equipment in use.*

7.4 Designated Eating and Smoking Areas

Ingestion of hazardous substances is possible when workers do not practice good personal hygiene habits. It is important to thoroughly wash hands, face, and other exposed skin after completion of work and before smoking, eating, drinking, and chewing gum or tobacco. No smoking, chewing, eating, applying lip balm, or drinking will be allowed within the cold test pit control zones. Personnel will wash their hands prior to using designated eating or smoking areas. Personnel will use only approved facility smoking areas located outside the work zones. Personnel will comply with all smoking policies including disposing of smoking materials in the proper receptacles.

8. HAZARD EVALUATION

The overall objectives of this hazards assessment section are to provide guidance on the following:

- Evaluating cold test pit waste or contaminant generation during normal cold test pit area maintenance and pit area operations to ensure that exposure to chemical agents remains below the exposure potential for cold test pit project personnel by all routes of entry
- Evaluating all cold test pit project tasks to determine the extent that existing chemical and physical hazards may potentially impact the safety of site personnel
- Establishing the necessary monitoring and sampling required to continuously evaluate exposure and contamination levels, determining adequate action levels to mitigate potential exposures, and providing specific actions to be followed if action levels are reached
- Determining engineering controls, isolation methods for contamination, work practices to limit personnel exposure, administrative controls, and appropriate respiratory protection and protective clothing to protect site personnel from hazards.

This HASP has been developed in accordance with MCP-255, "Hazardous Waste Operations and Emergency Response Activity Health and Safety Plans," and follows the hazard identification, evaluation, and mitigation process found in PRD-25, "Activity Level Hazard Identification, Analysis, and Control."

8.1 Cold Test Pit Site Activities

Personnel may be exposed to industrial, chemical, and physical hazards while working at the cold test pit sites. Radiological materials are simulated in some areas with rare earth tracers. No radiological contaminants are located at the cold test pits. The degree of hazards posed to onsite personnel entering the cold test pits will be low and typical for hazards associated with light construction and maintenance activities (Loomis et al. 1997). The hazard evaluation specific to project tasks beyond normal cold test pit maintenance activities will be incorporated in appendixes to this HASP, as these tasks are identified. Engineering controls will be implemented whenever possible, along with adequate work practices, real-time monitoring of contaminants, and site-specific hazard training to further mitigate potential exposures and hazards.

Normal cold test pit maintenance and operations tasks, with associated hazards, are summarized in Table 2. The material safety data sheet for all hazardous materials used will be maintained at the job site.

The dominant chemical compounds that are likely to be encountered during cold test pit project tasks are listed in Table 3.

An evaluation of these nonradiological contaminants relative to potential routes of exposure and symptoms of overexposure is presented in Table 4. The main exposure route for contaminants will be from respirable airborne dust during soil excavation and separation activities. Engineering and administrative controls, worker PPE strategies, personnel monitoring, and restricted access to control zones will reduce potential contamination. Most of the nonradiological contaminants listed were selected for use because they have high exposure limits and low potential for exposure to workers.

Table 2. Summary of cold test pits normal maintenance and operations activities, associated hazards, and mitigation.

Activity or Task	Associated Hazards or Hazardous Agent	Hazard Mitigation
Cold test pits maintenance and operations activities (Drill rig truck, logging truck, trailers, fork lifts, hydraulic line, and all support equipment)	Chemical and inorganic contaminants—cold test pit weed control activities	Controlled areas, qualified operators, job safety analyses (JSAs), safe work permits (SWPs), technical procedures (TPRs), or work packages.
	Equipment movement and vehicle traffic—trailers, drill rig, logging truck, forklift, or pinch points; ergonomic concerns; and struck-by or caught-between potential	Trained operators, JSAs, SWPs, TPRs, qualified heavy equipment operator (hoisting and rigging), designated traffic lanes and areas, watch body position, and wear personal protective equipment (PPE).
	Lifting and back strain—moving general equipment and staged materials	Mechanical equipment movement, proper lifting techniques, and two-person lifts.
	Subsidence of soil from heavy equipment—on or near cold test pit area pits (seasonal)	Inspect areas before walking on or driving equipment on pit surfaces.
	Heat and cold stress	Industrial hygienist monitoring and work-rest cycles, as required.
	Tripping hazards and working-walking surfaces—existing probes in ground, ice- and snow-covered surfaces, steps, and ladders	Awareness of probe locations, salt and sand icy areas, and use nonskid or high-friction materials on walking surfaces, where appropriate.
	Stored energy sources—electrical lines and panels, elevated materials, hoisting and rigging, and gas cylinders (P-10)	Identify and mark all utilities, ensure all lines and cords are checked for damage and continuity, use ground-fault circuit interrupter on outdoor equipment, comply with minimum clearances for overhead lines, and secure cylinders, caps, and bottles before movement.
	Hazardous noise levels—equipment operations or portable generators	Noise surveys and hearing protection (as required).

Table 3. Potential dominant chemical compounds at cold test pits.

Chemical	
Portland cement	Sodium sulfate
Calcium silicate	Sodium hypophosphate
Sodium nitrate	Calcium carbonate
Potassium nitrate	Calcium hydroxide
Sodium chloride	

The cold test pit site activities do not involve radiological hazards, as the cold test pit areas are free of radiological contamination. The SDA contains known radiological hazards that are not expected to impact work at the cold test pit areas though accidental release of radiological contamination during SDA work could present an exposure hazard to cold test pit workers. An event of this type is covered in Section 11. Radiological work permits, protective equipment, and dosimetry are not required for cold test pit activities. Industrial hygiene monitoring is outlined in Section 8.3.1.

8.2 Routes of Exposure

Exposure pathways for hazardous materials during maintenance and pit operations in the cold test pits are principally the movement of chemicals and simulated waste forms. Engineering controls, training, and work controls will mitigate potential contact and chemical exposure to these materials. Cold test pit activities do not present a significant potential for exposure to workers, but cold test pit activities can expose workers in the following ways:

- Inhalation of chemical compounds and fugitive dust during intrusive activities and examination tasks. This contamination may be in vapor, dust, or mist form. Inhaling these compounds or dust results in potential lung deposition.

- Skin absorption and contact with organic and inorganic compounds that can be absorbed through unprotected skin, resulting in chemical burns and uptake through skin absorption and skin contamination.

- Ingestion of organic and inorganic compounds adsorbed to dust particles or waste residues, resulting in uptake of contaminants through the gastrointestinal tract causing irritation, internal tissue damage, and deposition to target organs.

- Injection while handling simulated waste material components containing organic or inorganic materials by breaking the skin or migration through an existing wound, resulting in localized irritation, uptake of soluble components, and deposition of insoluble components.

Table 4. Evaluation of nonradiological contaminants at the cold test pit work sites.

Chemical Exposure	Exposure Limit	Routes of Exposure	Instrumentation Used for Monitoring	Target Organs or System	Carcinogen?	Exposure Potential (All Routes Relative to Personal Protective Equipment)
Sodium nitrate	3 mg/m^3 respirable dust	Inhalation, ingestion, and contact hazard	Personal sampling pump with cyclone and filter	Local irritant	No	Low
Sodium sulfate	3 mg/m^3 respirable dust	Inhalation, ingestion, and contact hazard	Personal sampling pump with cyclone and filter	Local irritant	No	Low
Sodium chloride	3 mg/m^3 respirable dust	Inhalation and ingestion	Personal sampling pump with cyclone and filter	Local irritant	No	Low
Sodium hypophosphate	3 mg/m^3 respirable dust	Inhalation, ingestion, and contact hazard	Personal sampling pump with cyclone and filter	Local irritant	No	Low
Calcium carbonate	10 mg/m^3 respirable dust	Inhalation and ingestion	Personal sampling pump with cyclone and filter	Local irritant: kidneys and central nervous system	No	Low
Calcium hydroxide	5 mg/m^3 respirable dust	Inhalation, ingestion, and contact hazard	Personal sampling pump with cyclone and filter	Local irritant	No	Low
Calcium silicate	10 mg/m^3 respirable dust	Inhalation, ingestion, and contact hazard	Personal sampling pump with cyclone and filter	Local irritant	No	Low
Potassium nitrate	3 mg/m^3 respirable dust	Inhalation, ingestion, and contact hazard	Personal sampling pump with cyclone and filter	Local irritant: kidneys and blood	No	Low
Portland cement	10 mg/m^3 respirable dust	Inhalation, ingestion, and contact hazard	Personal sampling pump with cyclone and filter	Local irritant	No	Low
Crystalline silica —quartz (from native soils)	0.1 mg/m^3 respirable dust	Inhalation	Personal sampling pump with cyclone and filter	Lung	Yes	Low

8.3 Environmental and Personnel Monitoring

The potential for exposure to nonradiological industrial hygiene airborne and contact hazards exists during tasks involving direct handling of chemicals and the simulated waste materials. These hazards will be present at low levels during completion of most tasks taking place at the cold test pit sites and only affects personnel who work directly with the materials in the control zones. Use of operating procedures, engineering and administrative controls, worker training, and protective equipment will mitigate most of these hazards. Monitoring with direct-reading instruments will be conducted to provide industrial hygiene personnel with real-time data to assess the effectiveness of these controls. Potential exposure issues relative to project-specific tasks (beyond normal cold test pit maintenance activities) will be addressed in appendixes to this document and incorporated as these tasks are identified.

The greatest exposure potential from cold test pit activities will be the inhalation of chemicals. The industrial hygienist and HSO will focus on these activities and monitor with direct-reading instrumentation and full- and partial-period air sampling in accordance with the applicable technical procedures, as deemed appropriate. Other workers and areas of the site will also be monitored to determine the level of chemical exposure to workers. Safety hazards and other physical hazards will be monitored and controlled, as outlined in Section 8.4. Specific hazardous-agent exposures that will be monitored are listed on Table 5.

Table 5. Action levels and associated responses for cold test pit project hazards.

Contaminant or Agent Monitored	Action Level	Response Taken if Action Level is Exceeded
Dust	>5 mg/m^3	Continue working, increase dust control, and monitor with sample pump with appropriate media.
Respirable dust	>1.5 mg/m^3	Continue working, increase dust control, and monitor with sample pump with appropriate media.
Noise	8-hour TWA >85 dBA	Wear hearing protection, continue working, and monitor with sound-level meter or noise dosimeter.
	10-hour TWA >83 dBA	Wear hearing protection, continue working, and monitor with sound-level meter or noise dosimeter.
Heat stress	Temperatures >90°F or use of full anti-contamination protective clothing	Implement MCP-2704, "Controlling Exposure to Heat and Cold Stress"; adhere to appropriate work and rest schedule; and monitor with heat stress monitor (wet-bulb globe temperature).

TWA = time-weighted average dBA = decibel A-weighted MCP = management control procedure

8.3.1 Industrial Hygiene Monitoring

All full- and partial-period airborne contaminant sampling will be conducted using applicable NIOSH or OSHA methods and in conformance to the INEEL *Safety and Health Manual*. Risk assessments for site personnel will be conducted in accordance with MCP-153, "Industrial Hygiene Exposure Assessment."

All monitoring instruments will be maintained and calibrated in accordance with the manufacturer's recommendations, existing industrial hygiene protocol, and in conformance to the INEEL *Safety and Health Manual*. Direct-reading instruments will be calibrated, at a minimum, prior to daily use and, more frequently, as determined by the project industrial hygienist. Calibration information, sampling

and monitoring data, results from direct-reading instruments, and field observations will be recorded per Section 3.

8.4 Physical Hazards Evaluation, Control, and Monitoring

This section describes the physical hazards present at the work site during normal maintenance and cold test pit operations, and the methods that will be used to monitor and control them. It will be critical that all personnel are aware and understand the nature of the tasks that will be conducted, the equipment to be used, and the controls in place to eliminate or mitigate potential safety hazards. Physical hazard issues relative to project-specific tasks (beyond normal cold test pit maintenance activities) will be addressed in appendixes to this HASP and will be incorporated as these tasks are identified.

8.4.1 Temperature Extremes

The cold test pit project activities will be conducted during months when there will be little potential that heat- or cold-stress factors could adversely affect task-site personnel because of ambient air temperatures and layered PPE.

8.4.1.1 Heat Stress. Outside temperatures are expected to be variable during cold test pit project activities and personnel may be required to wear protective clothing that prevents the body from cooling. High ambient air temperatures can result in increased body temperature, heat fatigue, heat exhaustion, or heat stroke that can lead to symptoms ranging from physical discomfort to unconsciousness and death. Employees will inform the field team leader, subcontract technical representative, project designee, or the HSO when they experience any of the signs or symptoms of heat stress or observe that a fellow employee or "buddy" is experiencing these signs or symptoms. In addition, the INEEL *Safety and Health Manual*; MCP-2704, "Controlling Exposure to Heat and Cold Stress"; and Table 6 describe heat stress hazards and symptoms.

Individuals showing any of the symptoms of heat exhaustion listed in Table 6 will stop work, move to a shaded area to rest, be provided cool drinking water, and be monitored by a medic, CPR/first-aid-certified employee. If employees exhibiting signs or symptoms of heat stress do not show signs of immediate recovery when removed to the rest area, they will be transported to the nearest medical facility for medical attention.

Monitoring for heat stress conditions will be performed in accordance with MCP-2704. Depending on the ambient weather conditions, work conditions, type of PPE worn, and the physical response of personnel, the industrial hygienist or radiological control technician will inform the field team leader, subcontract technical representative, or project designee of necessary adjustments to the work and rest cycle. In addition, physiological monitoring may be conducted to determine whether personnel are replenishing liquids fast enough. A supply of cool drinking water will be provided in designated eating areas and consumed only in these areas. Workers may periodically be interviewed by the industrial hygienist or HSO to ensure that the controls are effective and that excessive heat exposure is not occurring. Workers will be encouraged to monitor their body signs and to take breaks if symptoms of heat stress occur.

Note: *Heat exhaustion and heat stroke are extremely serious conditions that can result in death and should be treated as such. Transport individual immediately to the nearest medical facility.*

Table 6. Heat stress signs and symptoms.

Heat-Related Illness	Signs and Symptoms	Emergency Care
Heat rash	Red skin rash and reduced sweating	Keep the skin clean, change all clothing daily, and cover the affected areas with cornstarch or powder containing cornstarch.
Heat cramps	Severe muscle cramps, exhaustion, sometimes accompanied by dizziness or periods of faintness	Move the patient to a nearby cool place and give patient half-strength electrolytic fluids. If cramps persist, or if more serious signs develop, seek medical attention.
Heat exhaustion	Rapid, shallow breathing; weak pulse; cold, clammy skin; heavy perspiration; total body weakness; dizziness that sometimes leads to unconsciousness	Move the patient to a nearby cool place, keep the patient at rest, give the patient half-strength electrolytic fluids, treat for shock, and seek medical attention. DO NOT TRY TO ADMINISTER FLUIDS TO AN UNCONSCIOUS PATIENT.
Heat stroke	Deep, then shallow breathing; rapid, strong pulse, then rapid, weak pulse; dry, hot skin; dilated pupils; loss of consciousness (possible coma); seizures or muscular twitching	Cool the patient rapidly. Treat for shock. If cold packs or ice bags are available, wrap them and place one bag or pack under each armpit, behind each knee, one in the groin, one on each wrist and ankle, and one on each side of the neck. Seek medical attention as quickly as possible. Monitor the patient's vital signs constantly. DO NOT ADMINISTER FLUIDS OF ANY KIND.

8.4.1.2 Low Temperatures. Exposure to low temperatures may be a factor during times of cold test pit activities. Relatively cool, ambient temperatures and wet or windy conditions increase the potential for cold injury to personnel. The project industrial hygienist and HSO will be responsible for obtaining meteorological information to determine whether additional cold-stress administrative controls are required. Project personnel will also be cautioned regarding cold-stress factors associated with rapid cooling once impermeable PPE layers are removed, causing the potential for freezing of accumulated moisture on PPE outer and inner surfaces under extremely cold conditions.

The hazards of cold stress are discussed in MCP-2704. Cold-stress conditions will be monitored in accordance with the companywide safety and health manuals.

The following are provided as general measures for inner clothing layers to prevent cold stress:

- Workers should wear layered warm clothing (e.g., heavy socks and hooded garments) when the air temperature will be below 40°F (4°C). When the air temperature will be below 30°F (-1°C), clothing for warmth will be worn in addition to any required project-specific PPE, depending upon worker comfort. Warm clothing may include the following:
  - Insulated suits (e.g., whole-body thermal underwear)
  - Wool or polypropylene socks to keep moisture off the feet if there will be a potential for work activity that could cause sweating
  - Insulated glove liners and gloves with reflective surfaces that reflect body heat back to the hand should be used when air temperatures are extremely low (i.e., less than 5°F [-15°C])
  - Insulated boots and head cover (e.g., hard hat liners).

- At air temperatures below 30°F (-1.1°C), the following work practices will be followed:
    - Outer layers of clothing must be impermeable to water if the worker's clothing will become wet on a job site
    - Workers must change into dry clothing immediately if underclothing becomes wet; however, if the clothing becomes wet from sweating, the workers may finish the task that caused the sweating before changing into dry clothing
    - Workers will be provided a warm area (65°F [18.3°C] or above) to change from work clothing into street clothing
    - Workers will be provided a warm break area (60°F [15.6°C] or above)
    - Space heaters may be provided in the work area, if appropriate
    - Hot liquids such as soups or sweet drinks will be provided in the break area, but the intake of caffeine will be limited because of diuretic and circulatory system effects
    - The buddy system will be practiced at all times, and any personnel observed with severe shivering will leave the cold area immediately
    - Workers should layer their clothing (i.e., thinner, lighter clothing should be layered under heavier clothing)
    - Workers handling liquids that evaporate easily (e.g., gasoline or diesel fuel) will take special precautions to avoid soaking clothing or gloves with the liquids because of the added danger of cold injury caused by evaporative cooling
    - Work will be planned to minimize the need for workers to sit or stand still for long periods of time.

Additional cold weather hazards exist from working on snow- or ice-covered surfaces. Slip, fall, and material-handling hazards are increased under these conditions. Every effort must be made to ensure walking surfaces are kept clear of ice. The project manager, field team leader, subcontract technical representative, project designee, or HSO should be notified immediately if slip or fall hazards are noted at the cold test pit sites.

8.4.2 Noise

Excessive noise (noise levels greater than 85 dBA for 8 hours) may be present on the project because heavy equipment, portable generators, and power tools are used. Personnel assigned to the project may be exposed to levels of noise greater than 85 dBA in an 8-hour time-weighted average (TWA) or 83 dBA for a 10-hour TWA. The effects of high sound levels (noise) may include the following:

- Personnel being startled, distracted, or fatigued
- Physical damage to the ear, pain, and temporary or permanent hearing loss
- Interference with communication that would warn of danger.

Noise measurements will be performed by the industrial hygienist in accordance with MCP-2719, "Controlling and Monitoring Exposure to Noise," to determine whether personnel assigned to the jobs identified are above allowable-noise-exposure levels. A threshold limit value of 85 dBA will be applied to

personnel exposed to noise levels over no more than an 8-hour day. This level is based on a 16-hour recovery period in a low-noise environment. If personnel are required to work longer than 8 hours in a hazardous noise environment, then the threshold limit value will be adjusted to a lower value. The project industrial hygienist must be consulted regarding modifications to the 85 dBA for an 8-hour TWA and 83 dBA for a 10-hour TWA value.

Personnel will be enrolled in the INEEL OMP or appropriate subcontractor Hearing Conservation Program when noise exposure routinely meets or exceeds the allowable level. Personnel working on jobs that have noise exposures greater than 85 dBA for an 8-hour TWA or 83 dBA for a 10-hour TWA will be required to wear hearing protection until noise levels have been evaluated and will continue to wear the hearing protection specified by the industrial hygienist until directed otherwise.

8.4.3 Fire, Explosion, and Material Handling

Fires, explosions, and reactive material hazards at the cold test pits include potential combustible materials near ignition sources (hot motors or exhaust systems), transfer and storage of flammable or combustible liquids in the control zones, and chemical reactions (reduction, oxidation, and exothermic) from incompatible simulated waste materials. Portable fire extinguishers, with a minimum rating of 10A/60BC, will be strategically located at the site to combat Class ABC fires. Fire extinguishers will be located in all active work areas, on or near site equipment that has exhaust heat sources, and on or near all equipment that is capable of generating sparks.

Combustible or ignitable material in contact with or near exhaust manifolds, catalytic converters, or other ignition sources could result in a fire. The HSO will work with the project fire protection engineer to identify these sources, as equipment is brought on the site. The accumulation of combustible material will be strictly controlled at the cold test pit sites. Trash and weeds will be controlled at the job site to maintain a 9-m (30-ft) defoliated zone around equipment and structures. Combustibles (e.g., trash, cardboard, rags, wood, and plastic) will be properly disposed of in metal receptacles.

Gasoline or diesel fuel that will be used at the task site for generators and decontamination equipment (e.g., steam cleaner, if required for cold test) will be safely stored, handled, and used. Only flammable liquid containers approved by Underwriters Laboratories and labeled with the contents will be used to store fuel. All fuel containers will be stored at least 15 m (49 ft) from any facilities and ignition sources or stored inside an approved flammable storage cabinet. Additional requirements are provided in the INEEL *Safety and Health Manual* and in MCP-584, "Flammable and Combustible Liquid Storage and Handling."

Portable motorized equipment (e.g., generators and light plants) will be shut off and allowed to cool down in accordance with manufacturer operating instructions, prior to refueling, to minimize the potential for a fuel fire. Only qualified fuel-handling personnel will conduct fueling tasks.

8.4.4 Biological Hazards

The cold test pits are located in an area that provides habitat for rodents, insects, and reptiles. Based on biological studies at the INEEL, deer mice have been known to carry the Hantavirus. The virus can be present in the nesting and fecal matter of deer mice. A potential exists for project personnel to disturb nests or fecal matter during the course of mobilization and intrusive activities. If such materials are disturbed, they can become airborne and create a potential inhalation pathway for the virus. Also, contact with and improper removal of these materials may provide additional inhalation exposure risks.

If suspect rodent nesting or excrement material is encountered, the field team leader, subcontract technical representative, industrial hygienist, and HSO will be notified immediately and no attempt will be made to remove the matter or clean the area. Following an evaluation of the area, an SWP will be written for disinfecting and removing the matter from the project task area. The industrial hygienist will provide the necessary guidance for protective equipment, mixing, and application of the disinfecting solution (bleach solution), and proper disposal method of the waste. Typical PPE for disinfecting and removing a large nesting area may include a full-face respirator with a high-efficiency particulate air (HEPA) filter cartridge, Tyvek coveralls, outer booties, and two pairs of gloves (latex inner and nitrile outer). Generally, all seams including mating and overlapping PPE ensemble pieces will be taped.

Snakes, spiders, and insects (e.g., ticks and mosquitoes) may also be encountered at the cold test pit sites. Common areas of infestation include material stacking and staging areas, under existing structures (e.g., trailers and buildings), under boxes, and other areas that provide shelter. Protective clothing will prevent insects from direct contact with personnel; however, repellant may be required during Level D activities. Areas where standing water has accumulated provide breeding grounds for mosquitoes and should be avoided. In cases where large areas of standing water are encountered, it may be necessary to pump them dry or add a small concentration of nonhazardous surfactant to the water to break the surface tension during mosquito hatching phases. Consult with the environmental coordinator before adding surfactant to standing water.

8.4.5 Confined Spaces

No confined space has been identified or is anticipated at the cold test pits during normal maintenance and operations activities. If project-specific activities have the potential to create confined space conditions, an appendix to this HASP will be generated and added to this document to address these issues.

Work in a confined space may subject personnel to risks involving engulfment, entrapment, oxygen deficiency, and toxic or explosive atmospheres. If a suspected confined space is discovered and not properly posted, it will be treated as a permit-required confined space until a determination is made by an assigned safety and industrial hygienist professional. Entrances will be posted with the required danger or caution sign per MCP-2749, "Confined Spaces." A confined space entry permit is required before an employee can enter a confined space per MCP-2749.

8.4.6 Safety Hazards

Industrial safety hazards pose a significant, if not the most likely, threat to personnel that will be encountered while performing tasks at the cold test pit sites. Section 6 provides general safe-work practices that must be followed at all times. The following sections describe specific industrial safety hazards and procedures to be followed to eliminate or minimize potential hazards to project personnel.

8.4.6.1 Handling Heavy Objects. Heavy equipment operations on the project (i.e., handling and maneuvering drilling cases, bits, full-core sections, various other materials or pieces of equipment) can result in employee injury. Manual material handling will be minimized through task design and use of mechanical or hydraulic lifts, whenever possible.

8.4.6.2 Powered Equipment and Tools. All powered equipment and tools will be properly maintained and used by qualified individuals in accordance with the manufacturer's specifications. For all work performed with powered equipment, PRD-5101, "Portable Equipment and Handheld Power Tools," will be followed.

8.4.6.3 Heavy Equipment and Moving Machinery. The hazards associated with the operation of heavy equipment include injury to personnel, equipment, and property damage. All heavy equipment will be operated properly and in accordance with the manufacturer's instructions. Only authorized personnel will be allowed in the vicinity of operating heavy equipment and should maintain visual communication with the operator. Work-site personnel will comply with MCP-2745, "Heavy Industrial Vehicles"; and MCP-2743, "Motor Vehicle Safety."

Site personnel working around or near heavy equipment and other moving machinery will comply with the appropriate MCPs and STD-1090-99, "Hoisting and Rigging." Additional safe practices will include the following:

- Ensuring that all heavy equipment has functioning backup alarms
- Prohibiting walking directly in back of or to the side of heavy equipment without the operator's knowledge and taking all necessary precautions prior to moving heavy equipment
- Ensuring that the equipment operator maintains communication, while operating heavy equipment in the work area, with a designated person responsible for providing direct voice contact or approved standard hand signals and for ensuring all site personnel in the immediate work area are made aware of the equipment operations
- Keeping all equipment out of traffic lanes and access ways and storing all equipment to avoid endangering personnel at all times.

8.4.6.4 Electrical Hazards and Energized Systems. Electrical equipment and tools, as well as underground lines, may pose shock or electrocution hazards to personnel. Safety-related work practices will be employed to prevent electric shock or other injuries resulting from direct or indirect electrical contact. If work on energized systems is necessary, these practices will conform to the requirements in PRD-5099, "Electrical Safety"; PRD-5051, "Chapter IX-Lockout and Tagout"; MCP-3650, "Chapter IX Level I Lockouts and Tagouts"; and Parts I through III of National Fire Protection Association (NFPA) Standard 70E, "Standard for Electrical Safety Requirements for Employee Workplaces." In addition, all electrical work will be reviewed and completed under the appropriate work controls (i.e., HASP, SWPs, and work orders).

Before beginning any subsurface penetrations, underground utility clearances will be obtained by contacting telecommunications (526-1688 or 526-2512). Subsurface investigation clearance will be obtained in accordance with MCP-6205, "Subsurface Investigations." The requirements for advanced 48-hour notice will be met.

8.4.6.5 Personal Protective Equipment. Wearing PPE may reduce a worker's ability to move freely, see clearly, and hear directions and noise that might indicate a hazard. Also, PPE may increase the risk of heat stress. Work activities at the task site will be modified as necessary to ensure that personnel are able to work safely in the required PPE. Work-site personnel will comply with PRD-5121. The cold test pit project PPE levels for each task are described in Section 9.

8.4.7 Inclement Weather Conditions

When inclement or adverse weather conditions develop that may pose a threat to persons or property at the task site (such as sustained strong winds 25 mph or greater), electrical storms, heavy precipitation, or extreme heat or cold), these conditions will be evaluated and a decision made by the HSO (with input from the industrial hygienist, safety engineer, and other personnel as appropriate) to stop

work, employ compensatory measures, or to proceed. The field team leader, subcontract technical representative, or project designee shall comply with INEEL MCPs and site work control documents that specify limits for inclement weather.

8.4.8 Dust Control

During site activities, the project HSO or industrial hygienist will determine whether wind or other weather conditions pose unacceptable exposure hazards to personnel or the environment. Methods such as surfactants, wetting, and enclosures may be used to assist in dust control. Administrative controls such as designating routes of travel or restricting access to areas also may be implemented.

8.5 Other Site Hazards

Site personnel should continually look for potential hazards and immediately inform the safety engineer or HSO of the hazards so that action can be taken to correct the condition.

During scheduled work activities, the field team leader, subcontract technical representative, and HSO will conduct daily inspections of task sites to ensure that barriers and signs are being maintained, unsafe conditions are corrected, and debris is not accumulating. Health and safety professionals present at the task sites may, at any time, recommend changes in work controls to the field team leader or subcontract technical representative. However, all changes that may affect the cold test pit project's written work control documents (e.g., HASP and SWPs) must have concurrence from the appropriate project technical discipline representative onsite and have a document action request prepared on Form 412.11, "Document Management Control system (DMCS) Document Action Request (DAR)," as required.

Personnel working at the task sites are responsible to use safe-work techniques, report unsafe working conditions, and exercise good personal hygiene and housekeeping practices throughout the course of their jobs.